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BRIEF CASES

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Thompson Asset Management

"Thanks, Peter. I look forward to meeting you next week as well." Allison Thompson cradled the phone and looked out her office window at the Florida riverfront as she considered the possibilities and implications of her conversation with Peter Landman. As CEO and founder of Thompson Asset Management (TAM), an investment management firm that she had started in Jacksonville, Florida, in 2009, Thompson had grown the firm from a single client and a $500,000 investment to about $83 million in assets under management (AUM) in two funds. TAM had a proven track record of beating benchmarks and managing downside risk. The success of her strategies had brought in new clients each year. In 2014, she was hoping to expand her business. She was looking for larger high-net-worth clients and possibly institutional clients. Peter Landman, an investment officer from her alma mater, was considering TAM as an investment manager for part of the college's endowment. She wondered if this was the client she had been looking for to expand the business.

Company Background

With undergraduate degrees in finance and computer science, Thompson joined a quantitative asset management firm in Chicago in 2003. In her five years there, she completed her CFA certification and worked with the portfolio managers to implement quantitative trading strategies. The strategies she helped to develop consistently earned returns of 300–500 basis points above appropriate benchmarks. These results were all the more impressive because the strategies did little to manage the downside risk. The techniques were a mix of technical trading rules along with indicators typically used by growth strategists. Even during the global financial crisis of 2007–2009, the firm's funds did relatively well. However, the crisis led to a decline in AUM, from both capital losses and account redemptions. As a consequence, Thompson found herself unemployed at the end of 2008. Without missing a beat, she returned to her hometown of Jacksonville and started TAM. Although the first few years were difficult, TAM gave her a platform to further test and implement her investment ideas.

Thompson considered herself a market strategist, and TAM's initial fund, ProIndex, was designed to achieve returns in excess of the benchmark S&P 500 index while maintaining a risk level consistent with the index. The easiest way for her to maintain and adjust equity market exposure was to "index"

HBS Professor William Fruhan and writer John Banko prepared this case solely as a basis for class discussion and not as an endorsement, a source of primary data, or an illustration of effective or ineffective management. Although based on real events, and despite occasional references to actual companies, this case is fictitious and any resemblance to actual persons or entities is coincidental.

with timing. Prior to the 1990s, the easiest way to index while keeping trading costs low was through no-load, low-expense index mutual funds. The landscape changed in the 1990s, when Exchange Traded Funds (ETFs) became more widely available. The advantage of ETFs over traditional mutual funds was a low-cost structure. Most ETFs were designed to mimic a particular index at the lowest possible cost; annual expense ratios of 0.10% to 0.20% were common. Since the advent of ETFs, passive mutual funds that mimicked an index also started offering low expense ratios, but Thompson decided to stick with ETFs based on her track record of using them in her investment strategy. She back-tested several strategies and settled on using leveraged ETFs, coupled with technical analysis, to determine when to be in the market and when to be in cash. With the success of the ProIndex fund, TAM launched a mid-cap value fund at the start of 2013. With this fund, TAM moved away from a market-timing strategy and invested instead in actual firms based on value strategies. However, Thompson retained her quantitative methods, relying entirely on numbers rather than company visits, analyst calls, etc. By the end of 2013, the ProIndex fund had about $75 million in AUM. The newer fund, ProValue, did well in 2013 and grew to about $7.8 million.

In November 2013, Thompson met Peter Landman at a CFA luncheon and speaker presentation. Landman was an investment officer at the college where Thompson had received her degrees. As the lead manager for equity investments, Landman was interested in TAM's strategies. Although he did have concerns about the size of TAM, and whether its strategies were scalable, he asked Thompson to make a short presentation to the college's investment board about becoming an asset manager for the college. Landman told Thompson that the college had recently received a gift of $20 million earmarked for equity investments and that he was intrigued with TAM's success. The initial indication was that, *if selected*, TAM would be asked to manage the entire gift, using some combination of the ProIndex and ProValue funds. It seemed a great opportunity for Thompson to gain a large institutional client, along with the personal honor of managing funds for her alma mater.

In preparing for the meeting, Thompson updated the performance reports for the funds through the end of 2013. As she did so, she realized that she had another challenge: The ProIndex fund was scalable, so additional funds were unlikely to affect its strategy or performance. However, investing part of the $20 million in the ProValue fund meant this fund would need to invest in additional companies. Thompson was already considering the purchase of two new mid-cap stocks—ATO and CNO—that her analyst had recommended.[1] She wanted to give the board a clear picture of what the ProValue fund would look like with the additional funds. (**Exhibit 1** shows returns in the ProIndex fund from January 2009 through December 2013; more detailed data are available in the accompanying student spreadsheet. **Exhibit 2** offers a summary of returns for the ProIndex fund. **Exhibit 3** lists the specific dates that the strategy signaled to enter/exit the ETF strategy.)

In general, Thompson was pleased with the cumulative results. However, the market data (see **Exhibit 3**) highlighted an imperfection in the strategy. At the end of 2012, for example, she exited the market, only to re-enter within 10 days. The market did well during that period. The fund not only lost out on the market returns for that time but also had to pay transaction fees, which were about 0.25% of assets each time it entered or exited the market. The money market returns were very low throughout the entire period, averaging between 0.25% and 0.50% annualized. Her risk level was 50% higher than the market, even though her strategy had a 65.1% correlation with the market. Would the endowment accept this level of risk? Landman asked Thompson to calculate a variety of return and risk measures (defined in **Exhibit 4)**. None of her retail clients had been interested in these measures, and she was curious to see what the data would show. Also, Thompson turned to the Internet to see how various university endowments presented and discussed performance data. Although her alma mater did not

[1] The price data are included in the student spreadsheet in the tab for **Exhibit 7**.

have reports online, she found several universities that did. Harvard University's website for its endowment returns[2] was particularly helpful. (**Exhibit 5** lists the ProValue fund holdings and **Exhibit 6** for the fund's value. Daily closing prices are listed in **Exhibit 7**. See **Exhibit 8** for ProValue's historical statistics and current weights.)

Investments were made at the start of 2013 ($2.0 million) and at the start of each quarter as new funds were received, including any dividends received from the equities. She needed to analyze return data, along with performance relative to the S&P 400 Midcap Index. The performance numbers for the year looked good, with a final value of $7.82 million on investments of $5.5 million during the year. She was confident the fund had beat the benchmark index.

However, as she reviewed the holdings in this fund, she realized that she might need to rebalance some of the positions before she could consider adding either stock to the fund. She wanted to present data for what the fund characteristics would look like at various investments levels if part or all of the $20 million was added to this fund. Her analyst produced asset correlations and optimal weights for the portfolio[3] based on various desired expected returns (shown in **Exhibit 9** and **Exhibit 10,** respectively). These weights were developed using TAM's estimates of the stocks' expected returns based on her models, not their historical returns (top row of **Exhibit 10**).

Thompson also noted that many of the optimized portfolios required short positions (negative weights). She had never used short positions in her strategy before, and wondered whether to consider such positions or maintain the fund's long-only positions. What additional risks did using short positions entail? What would an endowment think about short strategies? (**Exhibit 11** shows the full optimized risk-return profile. **Exhibit 12** contains the monthly data for equities and the index for 2009–2013.)

Realizing she had much work to do before she met with Landman and the college's endowment board, Thompson turned away from her river view and back to her computer screen, to start developing a presentation.

[2] http://www.hmc.harvard.edu/investment-management/performance-history.html

[3] See http://en.wikipedia.org/wiki/Modern_portfolio_theory for a definition of optimization.

Exhibit 1 ProIndex and Market Prices[a]

Date	ProIndex Unit Value	S&P 500 Index Adjusted Closing Price
12/31/2013	$4.03060084	1848.36
12/30/2013	$3.99276781	1841.07
12/27/2013	$3.99459687	1841.40
12/26/2013	$3.99793750	1842.02
12/24/2013	$3.95302561	1833.32
12/23/2013	$3.92566345	1827.99
12/20/2013	$3.87629629	1818.32
12/19/2013	$3.83208473	1809.60
12/18/2013	$3.83753227	1810.65
12/17/2013	$3.69019282	1781.00
12/16/2013	$3.71796639	1786.54
12/13/2013	$3.66251520	1775.32
12/12/2013	$3.66350834	1775.50
12/11/2013	$3.69706723	1782.22
12/10/2013	$3.80039325	1802.62
1/21/2009	$1.00025797	840.24
1/20/2009	$1.00023812	805.22
1/16/2009	$1.00021828	850.12
1/15/2009	$1.00019843	843.74
1/14/2009	$1.00017859	842.62
1/13/2009	$1.00015874	871.79
1/12/2009	$1.00013890	870.26
1/9/2009	$1.00011905	890.35
1/8/2009	$1.00009921	909.73
1/7/2009	$1.00007937	906.65
1/6/2009	$1.00005952	934.70
1/5/2009	$1.00003968	927.45
1/2/2009	$1.00001984	931.80
1/1/2009	$1.00000000	903.25

[a] Complete data included in student spreadsheet, **Exhibit 1.**

Exhibit 2 ProIndex and Market Return Data

Year	ProIndex	S&P 500
2009	56.48%	23.45%
2010	14.16%	12.78%
2011	11.43%	0.00%
2012	17.20%	13.41%
2013	72.78%	29.60%
Cumulative, 2009–2013	303.06%	104.63%
Daily Standard Deviation	1.91%	1.23%
Annualized Standard Deviation	30.32%	19.47%

Exhibit 3 Market Signals

Date	Signal	Position
1/1/2009	Out	Money Market
5/7/2009	In	Leveraged ETF -- 240% of S&P Index
6/15/2010	Out	Money Market
10/11/2010	In	Leveraged ETF -- 240% of S&P Index
6/30/2011	Out	Money Market
12/6/2011	In	Leveraged ETF -- 240% of S&P Index
6/15/2012	Out	Money Market
8/13/2012	In	Leveraged ETF -- 240% of S&P Index
12/28/2012	Out	Money Market
1/4/2013	In	Leveraged ETF -- 240% of S&P Index

a) "Out" signal generated at end of day on date indicated. Strategy requires four days to fully exit the market.

b) "In" signal generated at end of day on date indicated. Able to reenter the market as the market opens on the next regular trading day.

Exhibit 4 Portfolio Performance Measures

Statistic	Explanation
Holding Period Return (HPR)	Return to the portfolio over a specific period of time, calculated as (ending value - beginning value) / (beginning value).
Annualized Return	Return expressed in annual terms. Daily HPR are converted to annual HPR by multiplying by 252 (trading days per year).
Standard Deviation	Usual statistical calculation for standard deviation.
Annualized Standard Deviation	Standard deviation expressed in annual terms. Daily standard deviations are converted to annual standard deviations by multiplying by the square root of 252.
Correlation	Usual statistical calculation for Pearson correlation coefficient.
Beta	A relative risk measure, calculated by regressing a portfolio's returns against the market returns. Also calculated by dividing the covariance between the portfolio and the market by the variance of the market.
Sharpe Ratio	Measure of a portfolio's return per unit of risk. Calculated as the (Portfolio Return - Risk-free Rate) / (Standard Deviation of Returns).
Treynor Ratio	Measure of a portfolio's return per unit of risk. Calculated as the (Portfolio Return - Risk-free Rate) / (Portfolio Beta).
Jensen's Alpha	A measure of a portfolio's return above its required return based on the Capital Asset Pricing Model. Calculated as (Portfolio Return - Risk-free Rate) - Portfolio Beta x (Market Return - Risk-free Rate).
Daily Tracking Error	Excess return of the portfolio over a benchmark portfolio. Calculated as the standard deviation of the (Daily Portfolio Return - Daily Benchmark Return).
Annualized Tracking Error	Tracking error expressed in annual terms. Daily tracking errors are converted to annual tracking errors by multiplying by the square root of 252.
Information Ratio	Measure of a portfolio's return per unit of risk. Calculated as the (Annual Portfolio Return - Annual Benchmark Return) / (Annual Tracking Error). A ratio above 0.75 is considered very good. A ratio above 1.0 is considered exceptional.

Exhibit 5 ProValue Holdings

Date	ROC	PII	MRC	ETFC	EGN	USM	BAH	FNF	LPLA
9/30/2013	10,400	6,000	18,000	56,000	9,700	16,200	49,000	32,000	26,400
6/28/2013	10,400	6,000	18,000	56,000	9,700	16,200	49,000	32,000	
3/28/2013	10,400	6,000	18,000	56,000	9,700	16,200			
12/31/2012	10,400	6,000	18,000	56,000					

a) Share additions to a portfolio are purchased at the closing price on the date shown.

Exhibit 6 ProValue Market Value [a]

Date	ROC	PII	MRC	ETFC	EGN	USM	BAH	FNF	LPLA	Total
12/31/2013	$747,968	$873,840	$580,680	$1,099,840	$684,917	$677,484	$883,470	$1,038,400	$1,242,120	$7,828,719
9/30/2013	691,392	772,680	482,400	924,000	737,976	737,586	838,880	846,080	1,006,632	7,037,626
6/28/2013	657,072	566,040	497,160	708,960	503,818	594,378	750,680	752,320		5,030,428
3/28/2013	667,472	548,580	592,740	599,760	499,938	500,256				3,408,746
12/31/2012	501,384	496,620	500,040	501,200						1,999,244

[a] Complete data included in student spreadsheet, **Exhibit 6**.

Exhibit 7 ProValue Daily Stock Prices and Index Value, 2013[a]

Date	ROC	PII	MRC	ETFC	EGN	USM	BAH	FNF	LPLA	ATO	CNO	S&P Midcap 400 Index
12/31/2013	$71.92	$145.64	$32.26	$19.64	$70.61	$41.82	$18.03	$32.45	$47.05	$45.42	$17.69	1,342.53
12/30/2013	$71.75	$145.78	$32.11	$19.37	$69.91	$41.85	$17.77	$32.54	$47.04	$45.20	$17.53	1,338.21
12/27/2013	$71.60	$143.33	$31.72	$19.45	$70.60	$42.26	$17.81	$32.59	$46.96	$45.17	$17.74	1,336.30
12/26/2013	$71.67	$144.23	$31.69	$19.46	$68.83	$42.01	$17.77	$32.90	$47.20	$45.01	$17.74	1,335.39
12/24/2013	$71.10	$142.96	$31.76	$19.41	$68.42	$41.73	$17.51	$32.94	$46.74	$45.21	$17.72	1,334.42
12/23/2013	$71.61	$143.21	$31.51	$19.48	$68.78	$41.28	$17.46	$32.00	$46.68	$45.02	$17.68	1,328.94
12/20/2013	$71.62	$141.57	$31.61	$19.34	$69.32	$40.51	$17.39	$31.40	$45.86	$45.21	$17.48	1,318.85
1/9/2013	$49.78	$85.95	$28.91	$9.37	$47.71	$31.04	$13.23	$24.40	$29.50	$34.25	$9.83	1,056.45
1/8/2013	$49.27	$85.91	$29.29	$9.26	$47.63	$30.90	$12.93	$23.93	$29.09	$34.01	$9.58	1,050.41
1/7/2013	$49.90	$84.10	$29.07	$9.35	$47.67	$31.64	$12.88	$23.94	$29.15	$33.95	$9.45	1,053.25
1/4/2013	$50.01	$84.21	$28.73	$9.39	$47.51	$31.70	$12.94	$23.83	$28.95	$34.75	$9.42	1,056.07
1/3/2013	$49.40	$84.30	$28.34	$9.19	$46.43	$31.49	$12.69	$23.82	$28.79	$34.41	$9.32	1,048.21
1/2/2013	$49.15	$84.80	$27.62	$9.19	$45.52	$30.96	$12.62	$24.04	$28.39	$34.58	$9.35	1,046.32
12/31/2012	$48.21	$82.77	$27.78	$8.95	$44.55	$30.23	$12.12	$22.95	$27.67	$33.96	$9.25	1,020.43

[a] Complete data included in student spreadsheet, **Exhibit 7**.

Exhibit 8 ProValue Portfolio Historical Statistics and Current Weights

Stock	ROC	PII	MRC	ETFC	EGN	USM	BAH	FNF	LPLA	ATO	CNO
Average Monthly Returns	4.38%	4.78%	2.55%	1.88%	1.93%	0.46%	3.03%	0.96%	1.97%	1.54%	3.82%
Historical Standard Deviation	15.18%	11.76%	8.74%	14.30%	8.63%	7.35%	13.23%	5.75%	8.73%	4.20%	18.38%
Current Weights, 12/2013	9.55%	11.16%	7.42%	14.05%	8.75%	8.65%	11.28%	13.26%	15.87%	0.00%	0.00%

Exhibit 9 ProValue Portfolio Correlations

Correlations	ROC	PII	MRC	ETFC	EGN	USM	BAH	FNF	LPLA	ATO	CNO
ROC	1.000	0.784	0.773	0.710	0.540	0.312	0.536	0.485	0.573	0.442	0.654
PII		1.000	0.630	0.553	0.552	0.168	0.551	0.352	0.584	0.385	0.608
MRC			1.000	0.588	0.590	0.234	0.510	0.444	0.460	0.515	0.485
ETFC				1.000	0.528	0.285	0.585	0.475	0.377	0.453	0.344
EGN					1.000	0.357	0.476	0.371	0.386	0.424	0.412
USM						1.000	0.327	0.865	0.420	0.308	0.475
BAH							1.000	0.298	0.136	0.107	0.379
FNF								1.000	0.449	0.436	0.539
LPLA									1.000	0.205	0.606
ATO										1.000	0.333
CNO											1.000

Exhibit 10 ProValue Portfolio Model Expected Returns and Optimal Portfolio Weights

Stock	Column C: ROC	Column D: PII	Column E: MRC	Column F: ETFC	Column G: EGN	Column H: USM	Column I: BAH	Column J: FNF	Column K: LPLA	Column L: ATO	Column M: CNO
Model Annual Expected Returns	33.00%	35.00%	20.00%	30.00%	22.00%	19.00%	22.00%	23.00%	24.00%	11.00%	33.00%
Historical Annualized Standard Deviation	52.58%	40.74%	30.26%	49.54%	29.89%	25.45%	45.82%	19.92%	30.25%	14.56%	63.66%
	Desired Annual Portfolio Return										
	15.00%	17.00%	19.00%	21.00%	23.00%	25.00%	27.00%	29.00%	31.00%	33.00%	35.00%
Stock	**Optimized Security Weights**										
ROC	6.2%	5.4%	4.5%	3.7%	2.9%	2.1%	1.3%	0.4%	-0.4%	-1.2%	-2.0%
PII	-25.6%	-22.2%	-18.8%	-15.4%	-12.0%	-8.6%	-5.2%	-1.9%	1.5%	4.9%	8.3%
MRC	-35.3%	-36.1%	-37.0%	-37.9%	-38.7%	-39.6%	-40.4%	-41.3%	-42.2%	-43.0%	-43.9%
ETFC	-22.5%	-22.3%	-22.1%	-21.9%	-21.6%	-21.4%	-21.2%	-21.0%	-20.8%	-20.6%	-20.3%
EGN	9.7%	11.5%	13.3%	15.1%	16.9%	18.7%	20.5%	22.3%	24.1%	25.9%	27.7%
USM	-78.0%	-85.2%	-92.5%	-99.7%	-106.9%	-114.1%	-121.3%	-128.5%	-135.7%	-143.0%	-150.2%
BAH	49.8%	49.2%	48.5%	47.9%	47.3%	46.7%	46.0%	45.4%	44.8%	44.2%	43.5%
FNF	93.4%	108.9%	124.5%	140.0%	155.6%	171.1%	186.7%	202.2%	217.8%	233.3%	248.9%
LPLA	49.7%	50.3%	50.9%	51.5%	52.0%	52.6%	53.2%	53.8%	54.3%	54.9%	55.5%
ATO	60.5%	48.9%	37.3%	25.7%	14.1%	2.5%	-9.1%	-20.7%	-32.3%	-43.9%	-55.5%
CNO	-7.9%	-8.3%	-8.7%	-9.1%	-9.6%	-10.0%	-10.4%	-10.8%	-11.2%	-11.6%	-12.0%

Exhibit 11 ProValue Mean-Variance Optimized Portfolios

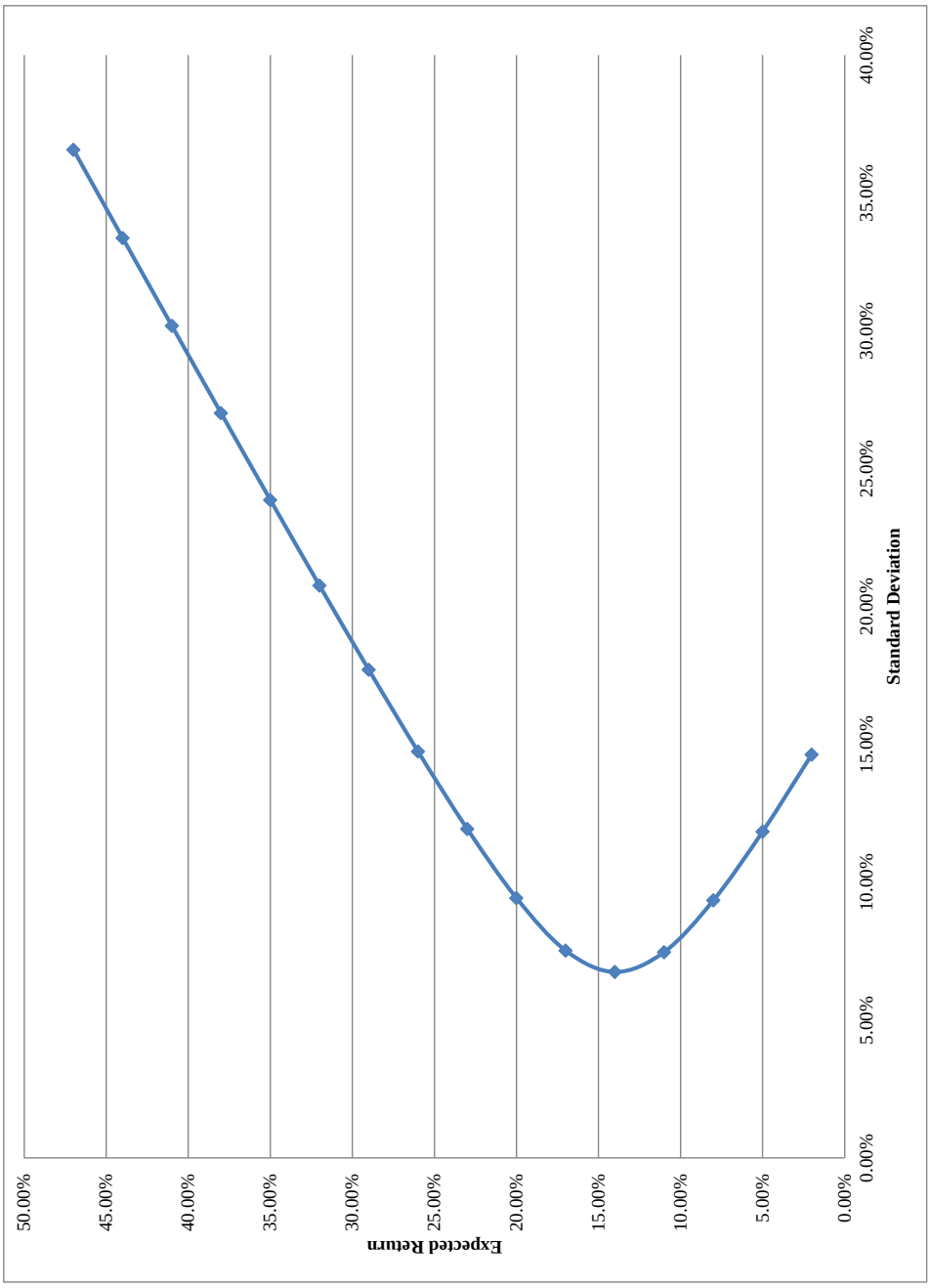

Exhibit 12 ProValue Monthly Stock Prices and Index Value, 2009–2013 [a]

Month Ending	ROC	PII	MRC	ETFC	EGN	USM	BAH	FNF	LPLA	ATO	CNO	S&P Midcap 400 Index ^SP400
Dec-13	$71.92	$145.64	$32.26	$19.64	$70.61	$41.82	$18.03	$91.96	$47.05	$45.42	$17.69	1,303.64
Nov-13	$68.46	$133.47	$30.59	$17.92	$72.02	$44.37	$16.47	$90.15	$42.87	$44.45	$16.89	1,290.71
Oct-13	$62.85	$130.54	$27.95	$16.91	$78.01	$48.40	$17.54	$91.93	$40.55	$43.91	$15.55	1,262.37
Sep-13	$66.48	$128.78	$26.80	$16.50	$76.08	$45.53	$17.12	$86.34	$38.13	$42.24	$14.37	1,181.48
Aug-13	$63.01	$108.87	$26.25	$14.04	$66.04	$42.78	$17.93	$79.73	$36.61	$40.02	$13.54	1,257.72
Jul-13	$66.83	$111.37	$26.82	$14.90	$59.52	$39.71	$18.85	$78.10	$37.70	$43.51	$14.22	1,172.33
Jun-13	$63.18	$94.34	$27.62	$12.66	$51.94	$36.69	$15.32	$73.11	$37.40	$40.38	$12.91	1,180.77
May-13	$65.77	$94.85	$28.39	$11.62	$53.86	$34.05	$15.29	$72.12	$36.73	$41.52	$12.26	1,139.19
Apr-13	$63.64	$85.20	$29.95	$10.29	$46.99	$32.97	$13.32	$70.56	$34.09	$43.29	$11.25	1,142.27
Jun-09	$13.94	$14.51	$11.58	$12.90	$37.91	$32.98	$5.67	$46.88	$22.81	$20.76	$2.33	596.51
May-09	$14.21	$14.35	$11.24	$14.40	$35.36	$35.62	$5.28	$49.78	$22.39	$19.90	$2.37	558.87
Apr-09	$11.71	$15.11	$11.12	$14.30	$34.20	$29.16	$5.70	$46.07	$18.56	$20.21	$1.58	494.45
Mar-09	$7.56	$9.56	$8.82	$12.40	$27.58	$28.60	$4.07	$46.01	$14.25	$18.91	$0.91	422.07
Feb-09	$5.61	$8.21	$7.81	$8.00	$25.37	$29.51	$2.95	$44.59	$15.69	$17.86	$1.19	
Jan-09	$7.15	$9.49	$8.38	$11.40	$27.55	$35.98	$5.05	$50.52	$16.76	$19.80	$2.29	
Dec-08	$10.28	$12.55	$8.81	$11.50	$27.66	$37.09	$4.97	$57.07	$18.11	$19.11	$5.10	

[a] Complete data included in student spreadsheet, **Exhibit 12**.